

IN THE CLAIMS:

Kindly cancel claims 1-18 without prejudice or admission and add the following new claims 19-53 as shown in the following listing of claims, which replaces all previous versions and listings of claims.

1. - 18. (canceled).

19. (new) A method of manufacturing a multi-tip probe comprising the steps of:

forming a cantilever using photolithographic techniques; and

forming a plurality of electrodes on the cantilever by irradiating the cantilever with a focused charged particle beam.

20. (new) A method of manufacturing a multi-tip probe according to claim 19; wherein the step of forming a plurality of electrodes comprises the steps of forming a plurality of lead portions by lithography at a base portion of the cantilever, forming a conductive shunt area at a distal end of the cantilever, and forming electrodes at the shunt area by sputtering or gas-assisted etching of the conductive distal end of the cantilever using a focused charged particle beam.

21. (new) A method of manufacturing a multi-tip probe according to claim 19; wherein the step of forming a plurality of electrodes comprises the steps of forming a plurality of lead portions by lithography at a base portion of the cantilever, and forming a plurality of electrodes at the distal end of the cantilever by irradiating the distal end of the cantilever with a focused charged particle beam while blowing a source gas toward the distal end.

22. (new) A method of manufacturing a multi-tip probe according to claim 19; wherein the step of forming a plurality of electrodes comprises the steps of forming the respective electrodes at a spacing of less than one micron from an adjacent electrode.

23. (new) A method of manufacturing a multi-probe according to claim 19; further comprising the step of forming a needle-shaped probe on a distal end of each of the electrodes by chemical vapor deposition using a focused ion beam device.

24. (new) A method of manufacturing a multi-tip probe according to claim 23; wherein the step of forming a needle-shaped probe further comprises the step of forming the needle-shape probe with a curved structure so as to have resilience.

25. (new) A method of manufacturing a multi-tip probe according to claim 19; wherein the step of forming the cantilever using photolithographic techniques includes the step of forming a convex portion at the distal end of the cantilever; and the step of forming a plurality of electrodes on the cantilever comprises forming the plurality of electrodes on the convex portion.

26. (new) A method of manufacturing a multi-tip probe comprising the steps of:

forming a cantilever;

forming a plurality of lead portions on the cantilever using photolithographic techniques; and

forming a plurality of conductive electrodes at a distal end of the cantilever by ion implantation using a focused charged particle beam and a source gas.

27. (new) A method of manufacturing a multi-tip probe according to claim 26; wherein the step of forming a plurality of conductive electrodes comprises the steps of forming a plurality of lead portions by lithography at a base portion of the cantilever, and forming the plurality of conductive electrodes at the distal end of the cantilever so as to be electrically connected to respective lead portions.

28. (new) A method of manufacturing a multi-tip probe according to claim 26; wherein the step of forming a plurality of conductive electrodes comprises the steps of forming a plurality of lead portions by lithography at a base portion of the cantilever, and forming the plurality of conductive electrodes at the distal end of the cantilever by irradiating the distal end of the cantilever with a focused charged particle beam while blowing a source gas toward the distal end.

29. (new) A method of manufacturing a multi-tip probe according to claim 26; wherein the step of forming a plurality of conductive electrodes comprises the step of forming the respective conductive electrodes at a spacing of less than one micron from an adjacent electrode.

30. (new) A method of manufacturing a multi-probe according to claim 26; further comprising the step of forming a needle-shaped probe on a distal end of each of the conductive electrodes by chemical vapor deposition using a focused ion beam device.

31. (new) A method of manufacturing a multi-tip probe according to claim 30; wherein the step of forming a needle-shaped probe further comprises the step of forming the needle-shape probe with a curved structure so as to have resilience.

32. (new) A method of manufacturing a multi-tip probe according to claim 26; wherein the step of forming the cantilever using photolithographic techniques includes the step of forming a convex portion at the distal end of the cantilever; and the step of forming a plurality of conductive electrodes on the cantilever comprises forming the plurality of conductive electrodes on the convex portion.

33. (new) A method of manufacturing a multi-tip probe comprising the steps of:

forming a cantilever;

forming a plurality of lead portions on a base portion of the cantilever;

forming a conductive shunt area at a distal end of the cantilever using photolithographic techniques; and

forming a plurality of conductive electrodes using a photolithographic technique to process the shunt area at the distal end of the cantilever.

34. (new) A method of manufacturing a multi-tip probe according to claim 33; wherein the step of forming a plurality of conductive electrodes using a photolithographic technique comprises the steps of forming a resist film on the shunt area, exposing the resist film using X-ray exposure or electron beam rendering, and performing dry or wet etching of the exposed resist film.

35. (new) A method of manufacturing a multi-tip probe according to claim 34; wherein the step of exposing the resist film using X-ray exposure is performed using a stepper, a mask aligner, or an SOR.

36. (new) A method of manufacturing a multi-tip probe according to claim 33; wherein the step of forming a plurality of conductive electrodes comprises the steps of forming a plurality of lead portions by lithography at the base portion of the cantilever, and forming the plurality of conductive electrodes at the distal end of the cantilever so as to be electrically connected to respective lead portions.

37. (new) A method of manufacturing a multi-tip probe according to claim 33; wherein the step of forming a plurality of conductive electrodes comprises the steps of forming a plurality of lead portions by lithography at the base portion of the cantilever, and forming the plurality of conductive electrodes at the distal end of the cantilever by irradiating the distal end of the cantilever with a focused charged particle beam while blowing a source gas toward the distal end.

38. (new) A method of manufacturing a multi-tip probe according to claim 33; wherein the step of forming a plurality of conductive electrodes comprises the step of

forming the respective conductive electrodes at a spacing of less than one micron from an adjacent electrode.

39. (new) A method of manufacturing a multi-probe according to claim 33; further comprising the step of forming a needle-shaped probe on a distal end of each of the conductive electrodes by chemical vapor deposition using a focused ion beam device.

40. (new) A method of manufacturing a multi-tip probe according to claim 39; wherein the step of forming a needle-shaped probe further comprises the step of forming the needle-shape probe with a curved structure so as to have resilience.

41. (new) A method of manufacturing a multi-tip probe according to claim 33; wherein the step of forming the cantilever using photolithographic techniques includes the step of forming a convex portion at the distal end of the cantilever; and the step of forming a plurality of conductive electrodes on the cantilever comprises forming the plurality of conductive electrodes on the convex portion.

42. (new) A surface characteristic analysis apparatus comprising:

a first cantilever having a multi-tip probe at a distal end thereof;

a second cantilever having an AFM probe at a distal end thereof spaced from the multi-tip probe by a predetermined distance; and

driving means for selectively driving the first and second cantilevers independently to be in or out of contact with a sample surface, such that the multi-tip probe is brought out of contact with the sample surface while an observed image of the sample surface is obtained using the AFM probe to determine a measurement region of the sample based on the observed image, and the multi-tip probe is brought into contact with the sample surface in the measurement region to conduct measurements.

43. (new) A surface characteristic analysis apparatus according to claim 42; wherein the driving means comprises a comb-shaped electrostatic actuator or a piezoelectric microactuator.

44. (new) A surface characteristic analysis device according to claim 42; wherein the AFM cantilever is a self-detecting cantilever having a strain gauge.

45. (new) A surface characteristic analysis device according to claim 42; wherein the multi-tip probe comprises a plurality of electrodes arranged in an array on the first cantilever each being spaced apart by less than one micron from adjacent electrodes.

46. (new) A surface characteristic analysis device according to claim 42; wherein the multi-tip probe comprises a plurality of lead portions at a base portion of the first cantilever, and a plurality of electrodes at the distal end of the first cantilever.

47. (new) A surface characteristic analysis device according to claim 42; further comprising a needle-shaped probe on a distal end of each of the electrodes.

48. (new) A surface characteristic analysis device according to claim 47; wherein each needle-shaped probe has a curved structure so as to have resilience.

49. (new) A surface characteristic analysis device according to claim 42; wherein the first cantilever has a convex portion at the distal end thereof; and the multi-probe is formed on the convex portion.

50. (new) A multi-tip probe comprising: a cantilever formed using photolithographic techniques; a plurality of lead portions formed on the cantilever; and a plurality of electrodes connected to respective lead portions, a pitch between adjacent electrodes being narrower than a pitch between the lead portions.

51. (new) A multi-tip probe according to claim 50; wherein the cantilever has a convex portion at a distal end thereof; and the electrodes are formed on the convex portion.

52. (new) A multi-tip probe according to claim 50; further comprising a needle-shaped probe provided at a distal end of each electrode.

53. (new) A multi-tip probe according to claim 52; wherein the needle-shaped probes are resilient members having conductance.